UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

S

Insect Control
Ashley

Vernal, Utah.

REPORT OF INSECT CONTROL OPERATIONS ON FOREST AND INDIAN LANDS, - LAKE FORK PROJECT, ASHLEY NATIONAL FOREST.

April, 1927.

History of Infestations.

While the evidence of old beetle attacks throughout the yellow pine belt in the Lake Fork - Dry Gulch region goes back for a considerable period, indicating a more or less continuous endemic condition, there at least was one small epidemic which occurred in about 1903 to 1910, thru which more than one million feet of timber was destroyed. (This estimate has been obtained from mill and timbermen who were operating in that region near that time.) Regarding this dpidemic, the Supervisor in 1914 reports as follows:

> "As has been reported to your office before in Ranges 2, 3, 4, 5 and 6 West, Township 2 North, in the Yellow Pine district we had an attack on the matured Yellow Pine gorwth some 10 or 12 years ago. This depredation continued for several years, but for the last four years very little sigh has been noticed. We took some specimens of the insects causing this infestment and found them to be the Black Hills Beetle (Dendroctonous Ponderosae). As near as can be ascertained, the attacks of this insect began on Townships emmerated and on some of the Indian lands adjacent thereto in 1903 and 1904, prior to the creating of that part of the Forest and continuing until 1909 and 1910. During these late years the insects seemed to disappear and we

> supposed that it was due to an attack made upon them by another winged insect, representing a wasp, to a large degree. At least we noticed that wherever these winged insects appear and commence to boring into the dying trees and depositing their eggs, the beetles immediately began to diminish and soon disappear entirely. The largest single patch of Yellow Pine killed contained about 200,000 ft."

The situation has apparently remained in low endemic stage since the termination of the epidemic referred to.

In 1924 the Ranger reported that no new infestations were apparent in this district. A few trees were reported to be dying annually, but the losses were very widely scattered. The active work then confined very much to the Lake Fork unit. Up to July, 1925, reports show that only a very few attacks were observed in the Dry Gulch area, or the region East from Yellowstone Canyon. (The actual number of trees treated on this single unit in April, 1927, was 154.)

With the appearance of new attacks in the Dry Gulch region in 1926 a further survey of the infestation was made by Ranger Clyde Lambert in September. Similarly, the Indian Department had become attracted to the situation by the increased number of trees dying in the Dry Gulch area on Indian lands. Accordingly, an extensive survey was made on Indian lands by Ranger Daniels of the Indian Service, assisted by Ranger Clyde Lambert. This was accomplished in January, 1927. The information from these surveys was the basis by which plans were formulated by the two departments for control work.

More than one hundred million feet of yellow pine timber on Forest and Indian lands were threatened by any serious outbreak of infestation, and with what appeared to be a rise in the number of attacks, in some quarters at least, it was considered to be the proper time to initiate positive measures for control. Accordingly, Mr. H. M. Tidwell, Superintendent of the Indian Agency, secured an allotment of $200 from the Indian Department in Washington, with authority to expend not to exceed $500 for this work, providing the additional $300 would be met by him through a saving of funds from other sources, and an allotment of $1000 was eventually made by the Forest Service to this project for the conduct of the work on National Forest lands.

Area.

The yellow pine belt covered by this project follows the base of the Uintah range at contours between 7400 and 8600 feet and runs slightly in a Northeast and Southwesterly direction, the stand being fairly divided between National Forest and Indian lands. The topography in general is quite gentle paralleling streams, but is rough and undulating at right angles to the drainage courses. The steep canyon side slope on Yellowstone River represented some of the roughest country to work.

Purpose.

The primary object of this project as a forest undertaking, of course, was to bring about a safe measure of control

on both National Forest and Indian lands by all available means as would contribute to the prevention of any dangerous spread of the infestation, or as would tend to reduce the probability of epidemic conditions, and as a means of furthering our grip on the insect problem over the Forest as a whole.

The opportunity afforded here in the training and development of personnel in the Forest insect problem; in recognizing epidemic conditions, and in methods of control, were also considered very prominently in the value of this undertaking which finally brought about its approval primarily as a training project, since it is becoming more and more keenly felt that the responsibility for recognizing these conditions must be centered in the man on the ground. It is he who must survey and go into the problem for sufficient information to enable him to know what is taking place. It is only with such knowledge of conditions that there will be well balanced organization for control.

Organization.

Under the direction of Forest Ranger Clyde Lambert in charge of the district, the camps were established by April 11th. Camp designated #1 was located at the Pat Clyde ranch in Yellowstone Canyon and the other camp at the McKune old mill setting between Lake Fork and Yellowstone Rivers. (See Map). On account of the depth of snow, which varied from a few inches at the Forest boundary to more than two feet further back, it took two teams one and one-half days to deliver the outfits

from Altonah to the designated camp sites, following which the extra teams were released. A team was provided for each camp but it was necessary to double up for each move. Both camps were set up and in readiness for use upon the arrival of the crews. Due to the large area and taking into consideration the snow conditions and the roughness of the cross country topography, adding to the difficulty of transportation, the work was handled most economically by the operation of two camps.

Ranger Benjamin Swapp reported at Altonah on the 8th of April, coming in via Ogden in a ½-ton truck, bringing with him saws and other equipment to be used on the job. He then assisted with the establishment of camps and in doing some advance cruising, continuing on the Forest project until the 21st when he joined the Indian Service crew to direct the work on Indian lands. The detail of 16 men from other Forests, headed by Assistant District Forester C.B. Morse, arrived at Duchesne on the 11th, most all of whom came in cars in groups of from 2 to 5 men to the car. Driving to Altonah on the 12th the men were divided and routed to the camps. The beds were hauled in by wagons and the cars were driven by other routes to points within three to four miles of the camps, from where the men hiked on in.

The detail of men to the job was as follows:

Name	Title	Forest.
David A. Arrivee,	Ass't. Forest Supervisor,	Targhee
Wilford Bentley,	Forest Ranger,	Powell
R. S. Dalley,	" "	Wyoming
L. H. Garner,	" "	Wasatch
Jay B. Hann	" "	Wyoming
Bert R. Lexen	" "	Weiser
Merrill Nielson,	" "	Uinta
T. Dean Phinney	Jr. Range Examiner,	Caribou
A. F. Richards,	Forest Ranger,	Uinta
Edward Ritter,	" "	Idaho
F. W. Seaman,	" "	Dixie
Benjamin Swapp	" "	Kaibab
T. G. Taylor,	Ass't. Forest Supervisor,	Wasatch
V. N. West	Forest Ranger	Wasatch
Albert Albertson,	" "	Fishlake
P. M. V. Anderson	" "	Manti

The Supervisor and the entire force of five rangers of the Ashley participated in the work, all continuing to the end of the operation.

The Job.

Actual control work was begun from both camps the morning of the 13th and ended on the 23rd. On account of the scattered condition of the infested trees, the camps were necessarily moved with progress of the work. Camp #1 was moved to the Dry Gulch Ranger Station on the 17th. Camp #2 moved West of Lake Fork River on the 15th and to Dry Gulch on the 20th. Both outfits then operated from the Dry Gulch R.S. until the closing of the work. (See map).

A 100% cruise was made of the areas worked and every successfully infested tree which could be found was treated. One area near Moon Lake containing infestations could not be reached economically on account of the great amount of snow. Another area in reach of the McKune mill operation was not worked, but left for the necessary treatment which is being handled under administrative use. A close follow-up is being

made by the local force to determine the number of trees missed. These will be recorded as a check against the accuracy of the cruise.

Following the completion of the work on National Forest lands, the crew in camp #2 worked an area of infestation on Indian lands in the Lake Fork region while awaiting the arrival of the teams for the removal of their camp to the Dry Gulch Ranger Station. Approximately 40 trees were treated here, which in so far as could be determined, was a 100% cleanup of that particular area.

The number of trees treated by camp units, Forest Service crews, is as follows:

Camp #1, first location,-	Yellowstone River.....	41 trees.
Camp #2, " "	between Yellowstone and Lake Fork.....	14 "
Camp #2, second "	West of Lake Fork.....	54 "
Both crews in Dry Gulch area.....		154 "
	Total	263 "

Indian Service Operations.

In order to strike conditions more favorable, the Indian Service did not begin work until the 21st and ended up about the 30th. The snow was then about all gone on Indian lands. Their organization, a crew of five men, moved into Dry Gulch and established camp. (See map). Ranger Benjamin Swapp joined them and directed the work, which was conducted similarly to the National Forest operations. The remaining yellow pine stands on Indian lands which had not been covered by the Forest Service crews as has been indicated, were worked. Approximately 50 trees were treated by them in Dry Gulch, which concluded their operations. In addition to this work

some infestations were cleaned up previously by the Geo. Hardinger and Indian Department sawmills, cutting yellow pine on Indian lands West of Dry Gulch. No record was kept of the infested trees removed so the exact number cannot be stated. Not more than possibly an equal number with those treated by their control crew were removed by these sawmill operations.

Condition of Infestations.

Observations were that the attacks in the Lake Fork and Yellowstone drainages were scattered generally and usually in large single trees. The total of 109 trees treated average 407 feet B.M. per tree. There was a considerable amount of round headed borers intermingled with the beetle larvae, so great in some instances that through their workings most of the cambium has been consumed, leaving the beetle larvae very widely scattered and insecurely situated in their galleries. A good many unsuccessful attacks were reported by the crews but the number was not recorded. The 100% cruise of the Lake Fork area at least showed that the infestation was remaining closely to normal endemic condition. On the Dry Gulch area the trees in general were smaller and in groups, the largest containing 17 trees. Of the total 154 trees treated the average was 171 feet B.M. per tree. It was particularly noticable that while the unsuccessful attacks were quite numerous the beetles have been making good and were going strong in the young trees. Here there were fewer signs of infestation by the secondary insects, and old beetle workings were much in absence as compared to the other drainages. While

the Dry Gulch area has been somewhat more accessible to the timber haulers, which would tend to cause the removal of the dead trees, such activity has not been at all great. There is an indication that the infestation was stronger here up to the operation than for years prior to that time. Whether or not the rise of the infestation has been a natural increase of the local broods, or whether these attacks have been strengthened by a spread from the Lake Fork unit Northwestward, is a question that probably will not be solved. However, the light infestation of the round headed borers (Cerym besids), competitors for the food, which was quite prominently noticed here, is a condition which, of course, would tend to favor the rise of the beetle infestations.

Complete survey of former attacks was not made or recorded, but representative strips were studied for the purpose of comparison. Those taken by units are as follows:

Ranger Swapp's record of beetle killed trees by classes during one day's cruising, between Yellowstone and Lake Fork:

Group No.	1	2	3	4	5	6	7	8	9	10	11	12	Total
Black tops	41	0	8	43	4	12	6	2	0	6	8	0	130
Red tops	12	3	1	3	-	1	-	-	3	-	0	3	26
Newly infested	2	2	-	-	-	-	-	-	-	-	1	-	5
Unsuccessful attacks	2	-	-	---	-	-	-	-	-	-	-	-	2

Beetle killed trees and unsuccessful attacks recorded by Mr. Swapp from two day's cruise West of Lake Fork:

Black tops 201; Red tops 16; Sorrel tops 2; unsuccessful 14
" " 5 " " 3 " " 1 " 3

One day's cruising on Indian lands from camp #2:

Group No.	1	2	3	4	5	6	7	Total
Black Tops	2	2	-	12	-	-	-	16
Red Tops	1	-	3	-	-	1	-	5
Newly infested	-	-	-	-	1	-	1	2

One day's record was kept by myself of the beetle killed trees on the area East from camp #1 on Yellowstone, which showed the following:

Group No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
Black Tops	-	-	-	2	-	2	2	-	3	2	1	3	-	-	15
Red Tops	2	2	1	2	6	-	-	1	7	-	3	-	-	-	24
Newly infestd.	-	-	1	-	7	-	-	4	2	-	-	-	1	1	16
Unsuccessful attacks	1	-	-	-	-	-	-	1	2	-	-	-	-	-	4

Dry Gulch area, - strip recorded by Ranger Walkup:

Group No.	1	2	3	4	5	6	7	8	Total
Black Tops°	35	-	-	-	2	-	-	1	38
Red Tops	-	1	-	-	1	-	-	2	4
New Attacks & treated	1	1	1	2	3	2	1	3	14
Unsuccessful	3	2	-	-	2	2	-	1	10

°The 35 Black top trees were all below 12" D.B.H.

Another strip was recorded by Mr. Walkup on Dry Gulch which showed the following:

Group No.	1	2	3	4	5	6	Total
Black Tops	-	-	1	-	-	-	1
Red Tops	2	-	1	-	-	-	3
New Attacks°°	2	1	1	1	1	1	7
Unsuccessful & untreated	1	1	-	-	1	-	3

°°All trees treated on this strip were above 20" and all were lightning struck.

Black Tops = dry trees without foliage.
Red Tops = trees with foliage completely turned from 1 to possibly as much as 3 years since the attack was made.
New Attacks= trees which were spotted for treatment, foliage a sorrel color or turning slightly, generally.
Unsuccessful attacks = newly infested, untreated trees in which the attacks did not make good.

The stages of reproduction of the beetle were from the egg to very well developed larvae. In many trees the adult beetles were still alive. Heavy production of larvae was in evidence; 20 to 30 larvae working from the main gallery of a single pair of beetles was commonly observed.

It was observed by the men that a very large number of the trees that had become infected were trees that had been damaged by lightning, also in a few instances it was shown that trees weakened through girdling by porcupines became easy prey to beetle attacks.

Methods.

Felling the tree and burning the bark off the log was the method of treatment followed almost exclusively. Peeling was done for the purpose of giving instruction, and in cases where the tree was in deep snow and inconveniently located for burning.

Weather - Snow Conditions.

The weather remained favorable with the exception of about three days of wind with snow. This interfered with cruising somewhat. The snow was packed hard which made moving camp difficult, but made hiking good until about noon, after which it would break through, slowing up progress considerably. The work was started out generally at 6 a. m. in order to take advantage of the crusted snow. Successful treatment by the burning method was difficult in many instances on account of the great amount of snow. It was imperative that the work be started early since most of the men were here on short

assignment and were obliged to return to duty in their respective fields by May 1. The man power would have been less had the work been deferred. The fact that the season was about two weeks later than the corresponding period a year ago made the forecasting of conditions to permit the organization of men for a satisfactory start very difficult, considering the further necessity for an early start in favor of getting the maximum number of men. Had it been possible to defer the work two weeks, with the corresponding reduction of snow, practically all phases of the operation would have been easier and accomplished much more economically.

Costs.

The costs included in this report are actual for miscellaneous hire and for supplies. The value of the labor is computed on the basis of the local wage schedule of $2.50 per day with board, the time beginning and ending at Altonah, the nearest base for men and supplies, amounting to about ½ day's travel each way to and from the project.

Equipment costs and freighting		$ 30.78
(Camp equipment supplied principally from stock in Vernal and Ogden.)		
Team hire		149.75
Forage		21.05
Miscellaneous		7.91
Subsistence supplies	$217.35	
Cook hire	87.00, total	304.35

984 meals = $0.31 cost per meal

The work was divided and accomplished as follows:

Travel time,	61½	man days @ $2.50 =	$153.75	
Spotting	73½	" " " " =	183.75	
Treating,	104	" " " " =	260.00	
Camp saw filing, etc.	8	" " " " =	20.00	
	247			617.50
		Total		$1131.34

Cost per tree (263).....$ 4.30

Cost per M ft.(7[illegible] ft.).....$15.93

Cost per 100 sqp ft. bark surface,
(38,651 sq. ft.)..... 2.93

Forest officers travel expenses to and from the detail, amounting to $618.97, have not been included here, since the cost of the work is computed on the common labor scale of wages as indicated, in arriving at costs as an operation undertaking. The two items, however, are approximately equal.

Training of Personnel.

As a training project this job certainly offered unlimited opportunity for first hand information in the many phases of beetle control. One meeting was held at Duchesne on the 11th in which Mr. Morse discussed the Forest Insect Problem and another meeting was held at the Dry Gulch Ranger Station at the close of the operation. The need for gathering fundamental information of a situation and practicable methods of attack which would lead ultimately to the prevention of epidemics were matters that were particularly stressed.

While engaged in active work the assignments of the men were arranged to alternate with spotting and treating so they could acquire the most knowledge in the shortest time. The crew in camp #1 received valuable instruction along with the work from Assistant District Forester, C. B. Morse, and the crew in camp #2 received very thorough instruction, incidental with the work, from Ranger Swapp, backed by his wide experience on the Kaibab. The job in itself; the pre-organization of men and equipment; movements and the conduct of the work on the ground, carried valuable information as an indication of strength and possible action in meeting emergencies when required.

All men worked hard and were highly interested and the opportunity for learning seemed to be well taken. Certainly it places the personnel of this Forest in a better position to cope with its remaining insect problems, in giving further attention to the active infestations in the yellow pine in the North end of the Forest and in the spruce and lodgepole areas.

General.

Excellent cooperation has been secured from the Indian Department. Mr. H. M. Tidwell, Superintendent, has made a well directed effort to control the infestations on Indian lands and no doubt will require close watch of the situation. To compensate in so far as possible for the work done by the Forest Service crew on Indian lands Mr. Tidwell made payment for the cook and team hire for camp #2 operating in part on Indian lands, amounting to $113.50, and in addition, transported the equipment we used on the job from Altonah back to Vernal, a distance of 66 miles.

The efficient services of Mr. Swapp are very highly appreciated, both by this office and the Indian Service for his help and valuable direction. Forest Ranger Clyde Lambert also very ably organized the camps for the job.

The value of this project from the standpoint of warding off epidemic conditions cannot be definitely estimated. Certainly, however, such work is a step in the right direction in control, and for the prevention of epidemics.

Respectfully submitted,

H. G. Ford
Forest Supervisor.

1. Burning insect infested yellow pine.

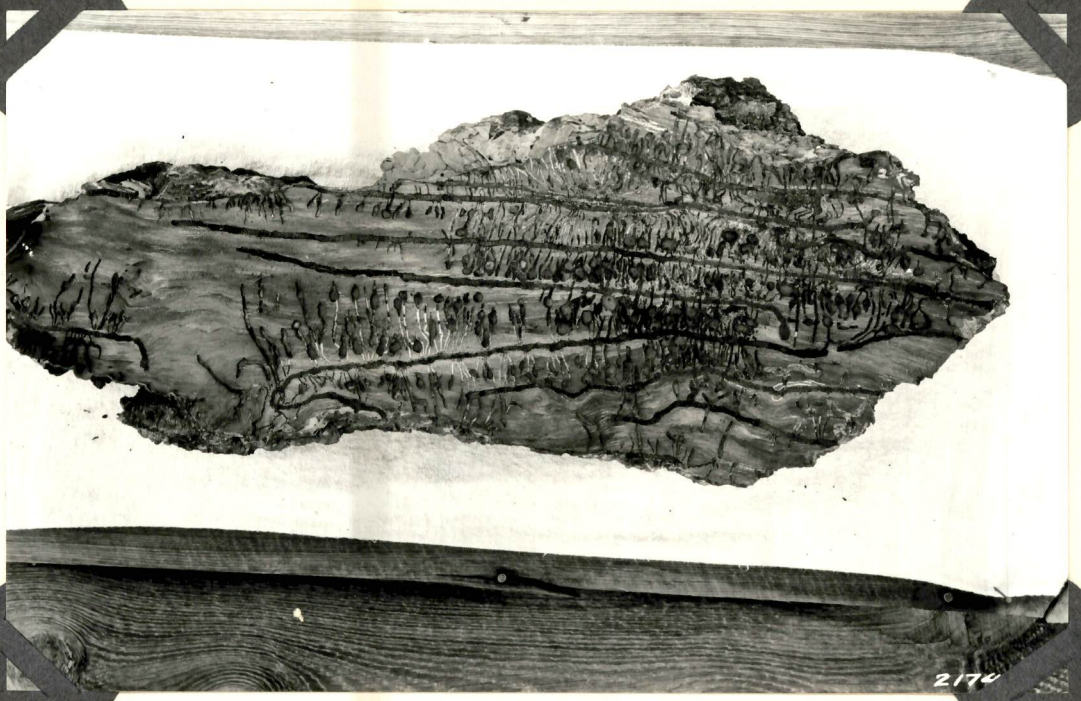
2. Bark on top of logs not burned.

3. Burning insect infested yellow pine.

4. Forest officers on Ashley insect control job.

5. Large piles burn best.

6. Felling insect infested tree.



7. Bark showing galleries of Dendroctonus ponderosae.

8. Peeling tree infested by Dendroctonus ponderosae.